MULTIMEDIA UNIVERSITY

STUDENT ID NO

VENUE : _____

SEAT NO : _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

TCP 1101 – PROGRAMMING FUNDAMENTALS

(All sections / Groups)

23 OCTOBER 2018
2.30 p.m. - 4.30 p.m.
(2 Hours)

Question	Marks
1	
2	
3	
4	
Total	

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 12 pages with 4 Questions only.
2. Attempt All the Questions. The distribution of the marks for each question is given.
3. Write all your answers in this Question paper.

Unless otherwise stated, every code segment provided in every question is contained within a `main()` function, complete with the directive `#include <iostream>`, `#include <vector>`, and the statements `using namespace std;` and `return 0;`

Question 1

Given the code segment on the left, write the output in the box on the right. [10 marks]

(a)

```
int a = 2 / 4 * 4;
int b = 2 * 4 / 4;
int c = 2 / 4.0 * 4;
int d = 2 * 4.0 / 4;
cout << a + b + c + d;
```

output:

(b)

```
int a = 5, b = 4, c = 3, d = 2;
cout << a + b * ( c + d ) - 1;
```

output:

(c)

```
bool a = true, b = true, c = false;
int n = 0;
if (a && b && c)
   n = n + 1;
if (a || b || c)
   n = n + 1;
if (a || b && c)
   n = n + 1;

cout << n;
```

output:

(d)

```
int x = 1, y = 0;
while (x < 7)
{
   y += x;
   x += 2;
}
cout << y;
```

output:

(e)

```
int x, y;
for (x=1, y=0; x < 7; y += x, x += 2)
{
}
cout << y;
```

output:

Continued...

(f)

```
int z = 2;
switch (z)
{
   case 1 : z = 3;
            break;
   case 2 : z = 4;
   default: z = 5;
 }
 cout << z;
```

output:

(g)

```
int x = 1;
int main()
{
   int x = 4;
   {
      int x = 7;
   }
   cout << x + ::x;
}
```

output:

(h)

```
int calculate(int x, int& y)
{
   x = x + 1;
   y = y - 1;
   return (x + y);
}

int main()
{
   int x = 6, y = 4;
   int cost = calculate(x, y);
   int result = cost - (x + y);
   cout << result;
}
```

output:

(i)

```
int a[5] = {4, 2, 1, 5, 3};

cout << a[ a[ a[4] ] - a[2] ];
```

output:

(j)

```
int a = 5, b = 6;
int *p1 = &a;
int *p2 = &b;
p2 = p1;
*p1 = 3;
cout << *p1 * *p2;
```

output:

Continued...

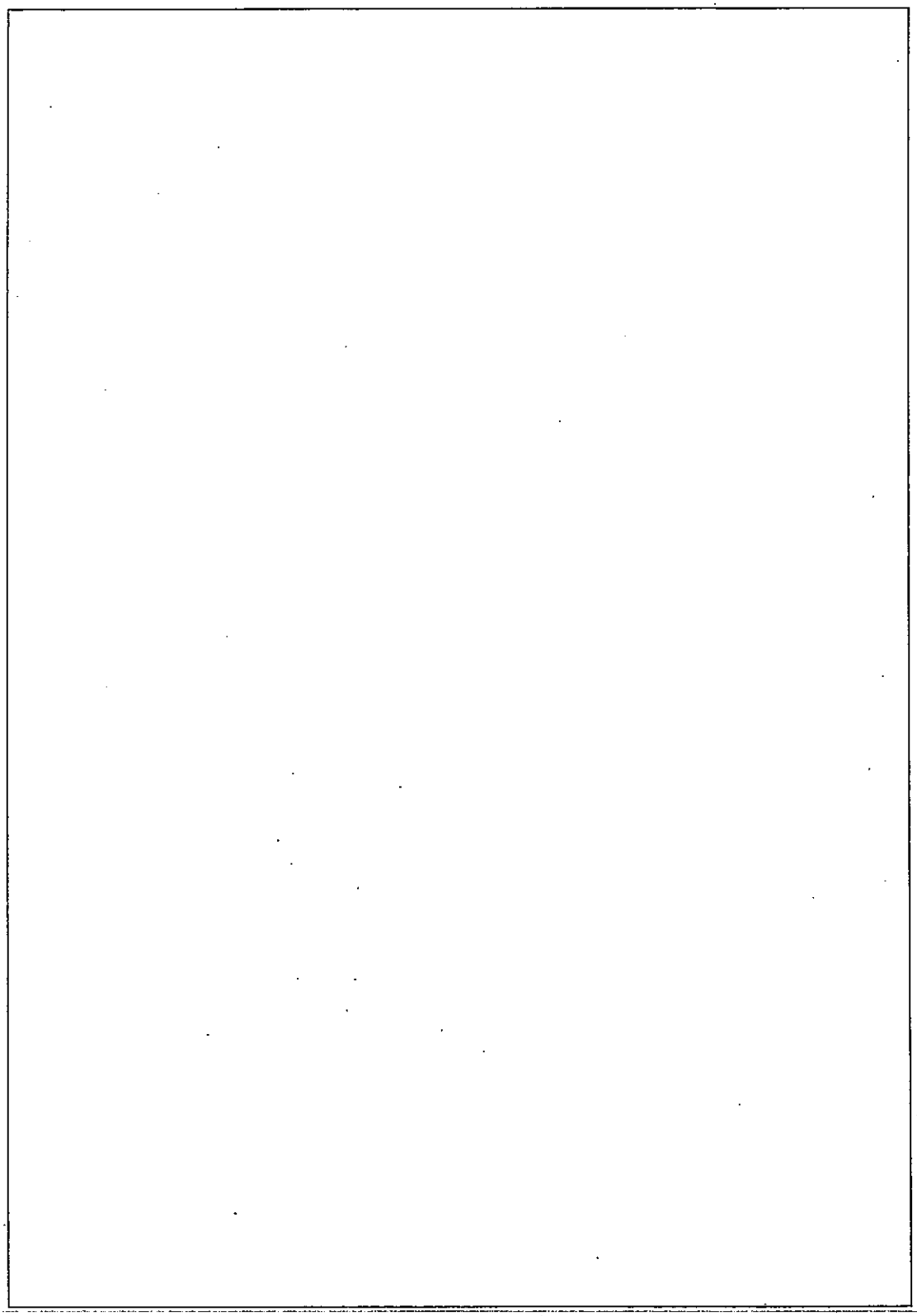
Question 2

(a) Given the C++ program below, draw the associated flowchart. [5 marks]

```
1.  #include <iostream>
2.  #include <string>
3.  using namespace std;
4.
5.  int main()
6.  {
7.     int d, r;
8.     char h;
9.
10.    cout << "Input => ";
11.    cin >> d;
12.
13.    string s = "";
14.
15.    while (d > 0)
16.    {
17.       r = d % 16;
18.
19.       if (r <= 9)
20.          h = '0' + r;
21.       else
22.          h = 'A' + r - 10;
23.
24.       s = h + s;
25.
26.       d = d / 16;
27.    }
28.
29.    cout << "Output = " << s << endl;
30. }
```

Draw your flowchart in the box given in the next page.

Continued...



Continued...

(b) Write the output for the C++ program below. [2 marks]

```
1.   #include <iostream>
2.   #include <string>
3.   using namespace std;
4.
5.   int main()
6.   {
7.      int r1 = 8;
8.      char h1 = '0' + r1;
9.      cout << h1 << endl;
10.
11.     int r2 = 12;
12.     char h2 = 'A' + r2 - 10;
13.     cout << h2 << endl;
14.  }
```

(c) Below are some sample runs of the program in (a).

Sample Run #1:

```
Input => 14
Output = E
```

Sample Run #2:

```
Input => 16
Output = 10
```

Sample Run #3:

```
Input => 161
Output = A1
```

At the boxes below, write out the output given the input shown. [3 marks]

(Tips: 2 x 16 + 10 = 42 1 x 16 x 16 = 256 8 x 16 x 16 x 16 x 16 x 16 x 16 = 134217728)

Run #1:

```
Input => 42
Output =
```

Run #2:

```
Input => 256
Output =
```

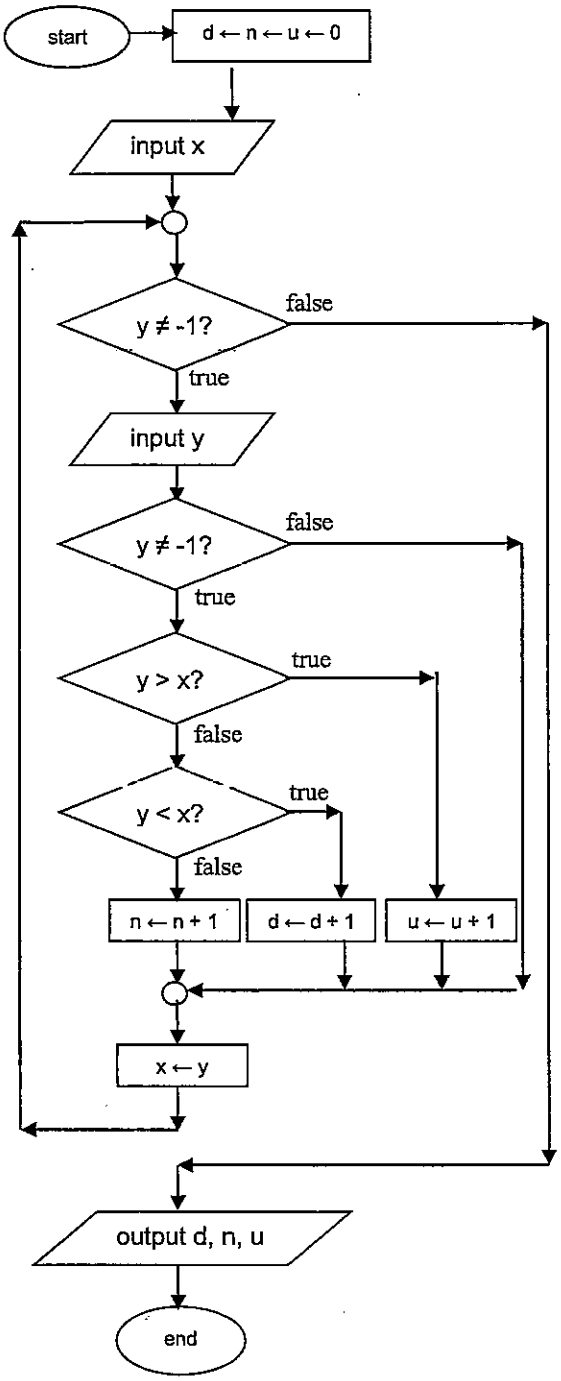
Run #3:

```
Input => 134217728
Output =
```

Continued...

Question 3

(a) Complete the C++ program on the right to implement the flowchart on the left.
[4 marks]




```
#include <iostream>
using namespace std;

int main()
{
    return 0;
}
```

Continued...

(b) Below are some sample runs of the program in (a).

Sample Run #1:

```
Input => 1
Input => 3
Input => 5
Input => 2
Input => -1
Output = 1 0 2
```

Sample Run #2:

```
Input => 6
Input => 5
Input => 4
Input => 4
Input => 3
Input => -1
Output = 3 1 0
```

Sample Run #3:

```
Input => 1
Input => 10
Input => 5
Input => 100
Input => 10
Input => 1000
Input => 1000
Input => 2000
Input => -1
Output = 2 1 4
```

At the boxes below, write out the output given the input shown. [2 marks]

Run #1:

```
Input => 5
Input => 4
Input => 3
Input => -1
Output =
```

Run #2:

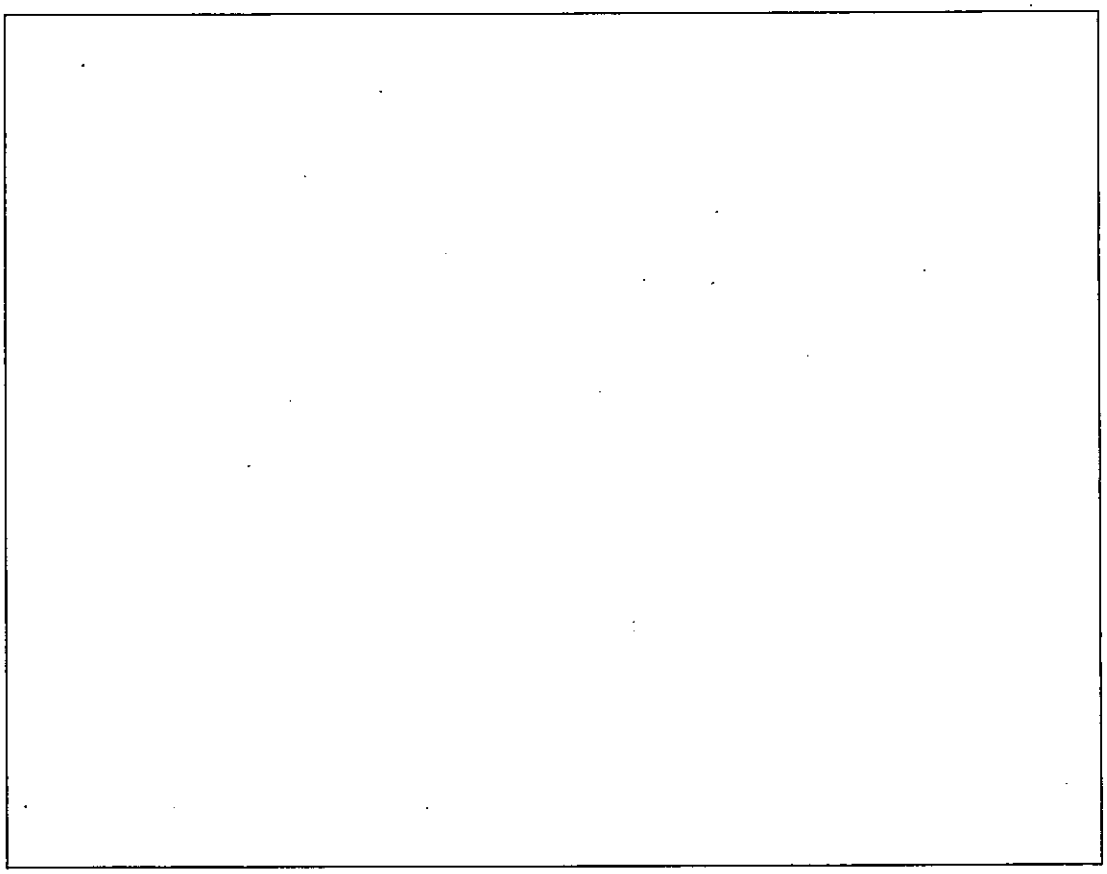
```
Input => 7
Input => 8
Input => 8
Input => 6
Input => 5
Input => -1
Output =
```

Continued...

(c) Complete the following C++ program which computes the number of vowels when the user provides a string. [4 marks]

```
#include <iostream>
#include <string>
using namespace std;

int count(const string& name, const string& searchStr)
{
   int lenName   = name.length();
   int lenSearch = searchStr.length();
```



```
    return count;
}

int main()
{
   string vowels = "AaEeIiOoUu";
   cout << "Enter name => ";
   string name;
   getline(cin, name);

   cout << "Number of vowels = ";
   cout << count(name, vowels) << endl;
}
```

Continued...

Question 4

(a) Write the output for the following C++ program. [2 marks]

```
1.  #include <iostream>
2.  using namespace std;
3.
4.  int main()
5.  {
6.     int a[8] = {2, 4, 6, 8, 12, 16, 35, 39};
7.     int *ptr = &a[4];
8.     *ptr = 3;
9.     cout << ptr[2]     << endl;
10.    cout << *ptr - 2   << endl;
11.    cout << *(ptr + 3) << endl;
12.    cout << a[4]       << endl;
13. }
```

(b) Given the following C++ program, write out the output for Line 24 to 29. Write "error" if the line contains compile time error which must be removed before the program can be compiled. [3 marks]

```
1.    #include <iostream>
2.    using namespace std;
3.
4.    double fun(int x, int y)
5.    {
6.       return x + y;
7.    }
8.
9.    double fun(double x, double y)
10.   {
11.      return x * y;
12.   }
13.
14.   double fun(int x, double y)
15.   {
16.      return x - y;
17.   }
18.
19.   int main()
20.   {
21.      int i1 = 6, i2 = 2, i3;
22.      double d1 = 6.0, d2 = 2.0, d3;
23.
```

Continued...

```
24.       cout << fun(i1, i2) << endl;
25.       cout << fun(d1, d2) << endl;
26.       cout << fun(i1, d2) << endl;
27.       i3 = fun(i1, i2); cout << i3 << endl;
28.       d3 = fun(i1, i2); cout << d3 << endl;
29.       d3 = fun(d1, i2); cout << d3 << endl;
30.    }
```

Output for Line 24 =>

Output for Line 25 =>

Output for Line 26 =>

Output for Line 27 =>

Output for Line 28 =>

Output for Line 29 =>

(c) Complete the following C++ program. [5 marks]

```
1.    #include <iostream>
2.    using namespace std;
3.
4.    class Triangle
5.    {
6.
7.          //constructor: default height is 1.0, default base is 2.0
8.
9.          void setHeight(double theHeight);
10.         void setBase(double theBase);
11.
12.
13.
14.      private:
15.         double height, base;
16.   };
17.
18.   Triangle::Triangle(double theHeight, double theBase)
19.   {
20.      height = theHeight; base = theBase;
21.   }
```

Continued...

```
22.
23.
24.   {
25.      height = theHeight;
26.   }
27.
28.
29.   {
30.      base = theBase;
31.   }
32.
33.   double Triangle::getHeight()
34.   {
35.
36.   }
37.
38.   double Triangle::getBase()
39.   {
40.
41.   }
42.
43.   double Triangle::getArea()
44.   {
45.      return 0.5 * height * base;
46.   }
47.
48.   int main()
49.   {
50.      Triangle t1;
51.      cout << t1.getHeight() << endl;
52.      cout << t1.getBase()   << endl;
53.      cout << t1.getArea()   << endl;
54.
55.      double height = 3;
56.      double base = 8;
57.      Triangle t2(height, base);
58.      cout << t2.getHeight()  << endl;
59.      cout << t2.getBase()    << endl;
60.      cout << t2.getArea()    << endl;
61.   }
```

End of Examination Paper.